

internally edged with whitish. Underside: both wings pale ochreous grey. Primaries with a darker spot at the end of the cell, edged with whitish; beyond this is a transverse sharply angled row of large darker spots, preceded by indefinite white dashes and edged laterally with white; this row extends from the costa just beyond the middle to near the middle of the inner margin, and is angled outwardly; beyond this is a row of darker lunules indefinitely and indistinctly edged with whitish; posterior margin finely dark. Secondaries with a small dark spot on the costa near the base, followed by a larger one about the centre of the costa; at the end of the cell is a rather large darkish spot laterally edged with whitish and paler in the centre, below which is another similar spot touching the inner margin; from this spot arises a curved row of similar spots extending up to the lower outer edge of the second dark costal spot; beyond this is a submarginal row of lunules laterally edged with whitish, outside which is a marginal row of smaller but more definite similar lunules; posterior margin finely dark; anal angle with two small black spots, above which, between the first and second median veins, is a larger black spot margined internally with yellow; slight blue metallic scaling is scattered over these spots.

♀. Upperside like the male, except that there is no white patch on the primaries, though there is a slight indication of a paler brown patch, and in the secondaries the marginal spots at the anal angle are continued nearly up to the apex. The underside pattern is the same, but in both wings the transverse row of large spots is very broadly margined externally with white, and the lunular marginal row is larger and more distinct, whilst in the primaries the row of large spots instead of being sharply angled is only curved.

Exp. alar., ♂ 31, ♀ 32 millim.

This species, which was taken in January, is somewhere near *L. lycænoides*; but it is not white underneath as that species is, and the pattern is different.

XXVIII.—*On the Distribution of Mid-water Chætognatha in the North Atlantic during the Month of November.* By R. T. GÜNTHER, M.A., F.R.G.S.

[Plate XXIV.]

A REPORT on the Cœlenterata obtained by Mr. George Murray during the cruise of the 'Oceana' in November 1898 appeared in the 'Annals' for April last. The organisms

submitted to the author for examination had been captured by open plankton-nets towed in series at definite depths between the surface and a little over two miles. The final results of the examination of the material showed that, at any rate so far as the Cœlenterate fauna was concerned, Mr. Murray's method was very useful, and one which may be made to yield valuable results.

It was found that in the nets which had been towed in the deeper waters of the Atlantic were several species of *Medusæ* and *Siphonophora* which were absent from all the nets towed nearer the surface. *Aglantha rosea* was abundant in hauls from below 1000 fathoms, but only occurred in small numbers in the more superficial hauls.

The object of the present communication is to show that the distribution of Chætonatha in the various nets leads us to similar conclusions and affords valuable confirmatory evidence that the dark intermediate waters of the ocean, into which the solar rays do not penetrate, are inhabited by a population of Chætonatha which, during the month of November at all events, is much denser than the population of the upper strata, into which sunlight penetrates.

In the preparation of the accompanying Table (Pl. XXIV.), in which the results of the investigation are summarized, the method adopted was to measure the lengths of the individuals found in the various hauls separately, and to enter the results of a census of individuals grouped according to their length in the appropriate places in the Table.

It is thought that in this way a clearer and more trustworthy representation of one of the elements composing the Atlantic meso-plankton will be obtained, and that thus the main object of the expedition will be better served than by a more or less imperfect attempt at classifying damaged material by taxonomic characters of disputed value.

Among the species recognized were Dr. G. H. Fowler's new species of *Sagitta Whartoni*, to which the longest individual (47 millim.) is referable, and which seems therefore to be a species characteristic of the Atlantic meso-planktonic fauna. Many of the smaller individuals seemed to resemble *S. bipunctata*. As might have been expected, *Spadella hamata*, Möbius, was taken in great numbers in most of the nets, but we are not aware of any previous record of this species from so great a depth as 1700 fathoms.

The chief facts of the distribution of the oceanic Chætonatha, which are clearly indicated in the accompanying Table (Pl. XXIV.), are, firstly, that the upper hundred fathoms contain but few individuals as compared with the

deeper waters of the Atlantic, and these few are small in size, being on the average less than 6 millim. in length.

Below 200 fathoms and down to 700 fathoms these small Chaetognatha become very abundant (no less than fifty-five appearing in the 500-fathom net), and numerous individuals averaging about 12 millim. make their appearance, also a few large specimens of 20-28 millim. were taken in the deeper nets.

Then appears a break in the uniformity of the distribution. The four nets which were towed at depths between 800 and 1000 fathoms caught far fewer Chaetognatha than the nets above or below this zone, and although one large individual of 35 millim. was taken, those exceeding 10 millim. were not common.

All nets from below 1000 fathoms brought up abundant individuals averaging from 8 to 10 millim., as well as a fair number between 10 and 15 millim. Specimens of 20 to 32 millim. were more frequent than in the more superficial 1000 fathoms, and in the nets from 1400 and 1500 were taken two gigantic Chaetognatha of 40 and 47 millim. respectively.

It appears, then, that whereas the distribution of the smaller Chaetognatha (*i. e.* under 14 millim. in length) is fairly uniform throughout the intermediate waters of the North Atlantic in November, with the possible exception of a zone between 800 and 1000 fathoms, the larger forms are both more numerous and attain to a larger size in the deeper waters; for whereas but a single specimen (29 millim.) exceeding 26 millim. was captured in the nets towed above 800 fathoms, eighteen specimens were found in the nets towed at depths between 900 and 1700 fathoms.

#### EXPLANATION OF PLATE XXIV.

The figures in the first column give the depths in fathoms at which the nets were towed. The value of each of the spaces between the horizontal lines is 20 fathoms.

The numbers of the nets in the second column refer to the five stations at which the nets were lowered; they are:—

Nos. 1 <i>b, c.</i>	Lat. 52° 4'·5 N., long. 11° 20'·1 W.
2 <i>a-g.</i>	Lat. 52° 4'·5 N., long. 12° 27'·0 W.
4 <i>a-l.</i>	Lat. 52° 27'·6 N., long. 15° 40'·0 W.
5 <i>a-l.</i>	Lat. 52° 18'·1 N., long. 15° 39'·9 W.
6 <i>b-h.</i>	Lat. 52° 20'·0 N., long. 15° 7'·9 W.

The numerals in the body of the table show the number of individual Chaetognatha of particular sizes captured by the nets indicated upon the same horizontal line.

The *length* (in millimetres) of the individuals is indicated by the figures

on the top line which stand vertically over the numerals in the body of the table.

An example will make this clear. At a depth of about 220 fathoms, in net numbered 6*b* were captured 16 individuals averaging 7·5 millim. in length. The extent of the *dark line* on either side of the figure 16 indicates that the 16 individuals varied from 6 to 9 millim. in length, but the average length is shown by the position of the figure 16 itself.

In another case, at a depth of 1500 fathoms, in net 4*j* were taken 50 Chætognatha varying in length from 7·5 to 11 millim., 2 of from 11·5 to 12·25 millim., and 7 individuals of the lengths indicated, of which the longest measured 47 millim.

The shaded areas serve to indicate the distribution of catches richest in individuals of particular lengths at a glance. They are graphic representations of the numbers, which have been drawn to an approximate scale.

XXIX.—*List of the Ostracoda collected by Mr. George Murray, F.R.S., during the Cruise of the 'Oceana' in 1898\*.*  
By Dr. GEORGE STEWARDSON BRADY, F.R.S.

Lat. 52° 4'·5 N.  
Long. 12° 27' W.

		No. of Net, &c.	
2 <i>b</i> .	Nov. 19.	270 fath.	<i>Microconchæcia Clausii?</i> Immature.
2 <i>c</i> .	"	270 fath.	<i>Conchæcia magna</i> , Claus. Few. <i>Paraconchæcia spinifera</i> , Claus. 1.
2 <i>d</i> .	"	374 fath.	<i>Conchæcia maxima</i> , B. & N. ? Few.
2 <i>e</i> .	"	464 fath.	<i>Paraconchæcia oblonga</i> , Claus. Few.
2 <i>f</i> .	"	620 fath.	<i>Conchæcia hyalophyllum</i> , Claus. 1. <i>Conchæcia imbricata</i> , Brady. 1. <i>Conchæcilla armata</i> , Claus. <i>Paraconchæcia oblonga</i> , Claus. Several.
2 <i>g</i> .	"	650 fath.	<i>Paraconchæcia oblonga</i> , Claus. Several.

Lat. 52° 27'·6 N.  
Long. 15° 40'·0 W.

4 <i>a</i> .	Nov. 20.	Surface.	<i>Conchæcia</i> sp. ? 1.
4 <i>b</i> .	"	790 fath.	<i>Paraconchæcia spinifera?</i> , Claus. 1.
4 <i>c</i> .	"	920 fath.	<i>Conchæcia imbricata</i> . 1. <i>Conchæcia maxima?</i> <i>Conchæcia</i> ? sp. 2 or 3.

\* The method of capture, by a number of open tow-nets in series, is described in Journ. Geogr. Soc. vol. xiii. no. 2, Feb. 1899.